
Image: NOAA NWS


Image: NASA


Image: EPA

OVERVIEW OF EARTH SYSTEM PREDICTABILITY R&D WORKSHOP

30 November 2020

Jim Hurrell, Colorado State University

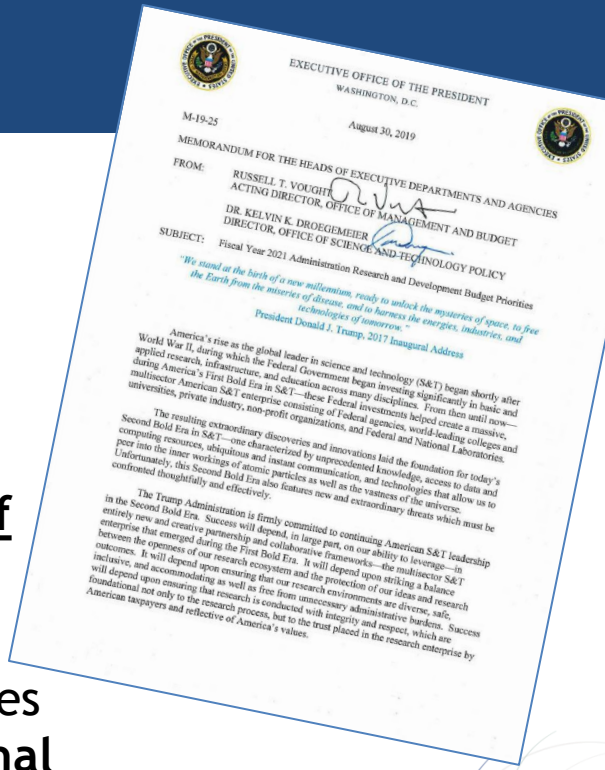
NOAA-DOE Precipitation Processes and Predictability Workshop

The National Academies of SCIENCES ENGINEERING MEDICINE

FY2021 Administration R&D Budget Priorities
Earth System Predictability

Departments and agencies should

- Prioritize R&D that helps **quantify Earth system predictability** across multiple phenomena, time, and space scales.
- Emphasize how measures of and limits to predictability, both theoretical and actual, can **inform a wide array of stakeholders**.
- Explore the **application of AI and adaptive observing systems** to enhance predictive skill, along with strategies for obtaining substantial **improvements in computational model performance** and spatial resolution across all scales.



EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON, D.C.

M-19-25

August 30, 2019

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: RUSSELL T. VOUGHT
ACTING DIRECTOR, OFFICE OF MANAGEMENT AND BUDGET

DR. KELVIN K. DROEGEMEIER
DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY

SUBJECT: Fiscal Year 2021 Administration Research and Development Budget Priorities

"We stand at the birth of a new millennium, ready to unlock the mysteries of space, to free the Earth from the miseries of disease, and to harness the energies, industries, and technologies of tomorrow."
President Donald J. Trump, 2017 Inaugural Address

America's rise as the global leader in science and technology (S&T) began shortly after World War II, during which the Federal Government began investing significantly in basic and applied research, infrastructure, and education across many disciplines. From then until now—during America's First Bold Era in S&T—these Federal investments helped create a massive, multisector American S&T enterprise consisting of Federal agencies, world-leading colleges and universities, private industry, non-profit organizations, and Federal and National Laboratories.

The resulting extraordinary discoveries and innovations laid the foundation for today's Second Bold Era in S&T—one characterized by unprecedented knowledge, access to data and computing resources, ubiquitous and instant communication, and technologies that allow us to peer into the inner workings of atomic particles as well as the vastness of the universe. Unfortunately, this Second Bold Era also features new and extraordinary threats which must be confronted thoughtfully and effectively.

The Trump Administration is firmly committed to continuing American S&T leadership in the Second Bold Era. Success will depend, in large part, on our ability to leverage—in entirely new and creative partnership and collaborative frameworks—the multisector S&T enterprise that emerged during the First Bold Era. It will depend upon striking a balance between the openness of our research ecosystem and the protection of our ideas and research outcomes. It will depend upon ensuring that our research environments are diverse, safe, inclusive, and accommodating as well as free from unnecessary administrative burdens. Success will depend upon ensuring that research is conducted with integrity and respect, which are foundational not only to the research process, but to the trust placed in the research enterprise by American taxpayers and reflective of America's values.

National Science and Technology Council (NSTC) Fast Track Action Committee (FTAC)

- Established February, 2020
- Participation from a number of key agencies: NOAA, NASA, DOE, NSF, OMB, Navy, Air Force, USDA, and USGS
- Focused on predictability of Earth system as it pertains the atmosphere-biota-hydrosphere system, across all spatial and temporal scales.
- Extended a Request for Public Information (RFI)

Overview of NASEM Contributions

- NASEM and OSTP co-sponsored Roundtable on April 16, 2020
- NASEM convened Workshop on June 4-5, 2020

AGENDA

Welcome and Opening Remarks (Jim Hurrell, Kelvin Droegemeier)

1. Purpose-driven Practicable Predictability
2. Theoretical Limits on Earth System Predictability
3. Exploring Predictability through New Methodologies & Technologies
4. Optimizing Observations to Explore Predictability
5. A Holistic Earth Modeling Framework
6. A New Research Framework for Practicable Earth System Predictability

Workshop Participants

Virtual participation: WebEx + Livestream

- 40 speakers, panelists, staff
- 1629 unique viewers on the livestream, total viewing duration of over 3627 hours
- 284 engaged on Slack
- 30 states, 16 countries

NASEM Workshop Output

- Proceeding – in brief (www.nap.edu)
- Project Website: https://www.nationalacademies.org/event/06-04-2020/workshop-on-earth-system-predictability-research-and-development
  - Presentations
  - Recordings of Workshop Webcast
- Slack channels #earthsystemworkshop

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NSTC FTAC Report

EARTH SYSTEM PREDICTABILITY
RESEARCH AND DEVELOPMENT
STRATEGIC FRAMEWORK AND ROADMAP

A Report by the
FAST TRACK ACTION COMMITTEE ON EARTH SYSTEM PREDICTABILITY RESEARCH AND DEVELOPMENT
of the
NATIONAL SCIENCE & TECHNOLOGY COUNCIL

October 2020

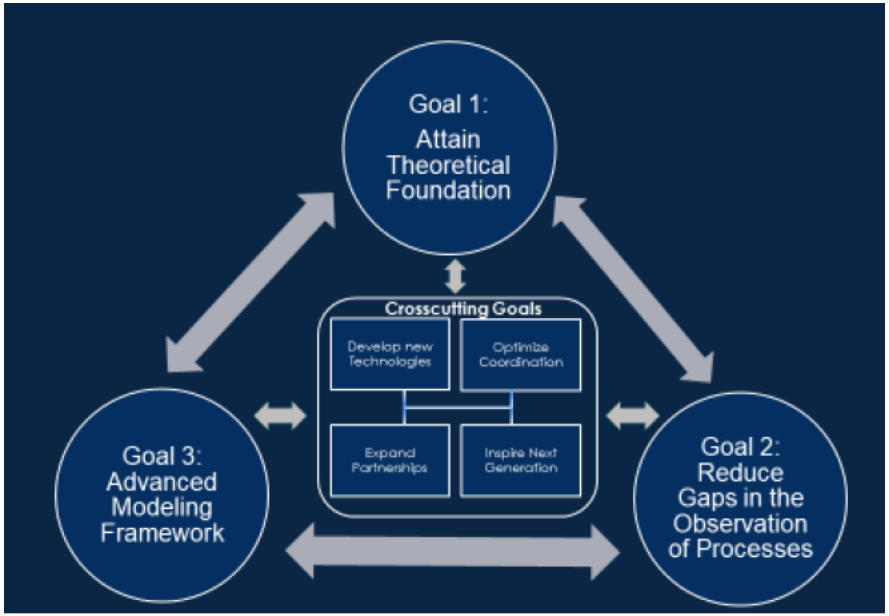

Figure 1: Key elements of the ESP R&D Strategic Framework.

NSTC FTAC Report

NOAA-DOE Precipitation Processes and Predictability Workshop
November 30 – December 2, 10:00 am – 3:00 pm (Eastern)

Day 3 – December 2, 2020		
Session 4: Reginal Precipitation		
This session focuses on the regional aspects of precipitation prediction challenges, with emphasis on gaps in our observing systems, advanced data assimilation methods, and representation of key physical processes in the numerical prediction models for capturing severe weather events, their climatology, and variability.		
Start Time (EST)	**Topic**	**Speaker**
10:00 AM	Session Introduction	Angie Pendergrass (NCAR), Ana Barros (Duke), Vijay Tallapragada (NOAA/NWS), Co-chairs
10:05 AM	Keynote: Operational Forecasting of Precipitation with Emphasis on Regional Aspects	Dave Novak (NCEP/WPC)
10:25 AM	Q&A	
10:30 AM	Break – Stretch	
10:35 AM	Introduction of Panel	Co-chairs
10:40 AM	Pacific Northwest Precipitation and Snowstorms as Seen in the Field	Lynn McMurdie (U Washington)
10:45 AM	Atmospheric Rivers and Their Impact on Precipitation Forecasts in the West Coast	Marty Ralph (CW3E/Scripps)
10:50 AM	Observational Perspectives, Including the Upcoming TRACER Campaign	Anita Rapp (TAMU)
10:55 AM	Model Biases in Southeastern US Precipitation	Johnna Infanti (NOAA/CPC)
11:00 AM	Open Discussion: Speaker & Panel	
12:00 PM	End of Session	
LUNCH		
Slide Reel: Current Capabilities and Systems Relevant to Precipitation Processes and Predictability		
Wrap-up Session: Agencies/Programs Inputs		
Start Time (EST)	**Topic**	**Speaker**
1:00 PM	Session Introduction	Jin Huang (NOAA/CPO), Renu Joseph (DOE/ESSMD), Co-chairs
1:05 PM	Agency – NSF	Anjuli Bamzai (NSF)
1:15 PM	Agency – NASA	Gail Skofronick-Jackson (NASA)
1:25 PM	Agency – DOD	Mike Farrar (USAF)
1:35 PM	OSTP – Earth System Predictability; ICAMS	Annarita Mariotti (OSTP)
1:45 PM	US CLIVAR	Mike Patterson, Director
1:55 PM	Break – Stretch	
2:00 PM	Session Summaries – 4 Topics	Session Chairs
2:40 PM	Discussion: Q&A	
2:50 PM	Next Steps – Workshops, Report	Renu Joseph (DOE/ESSMD), Jin Huang (NOAA/CPO), Co-chairs
3:00 PM	End of Session	

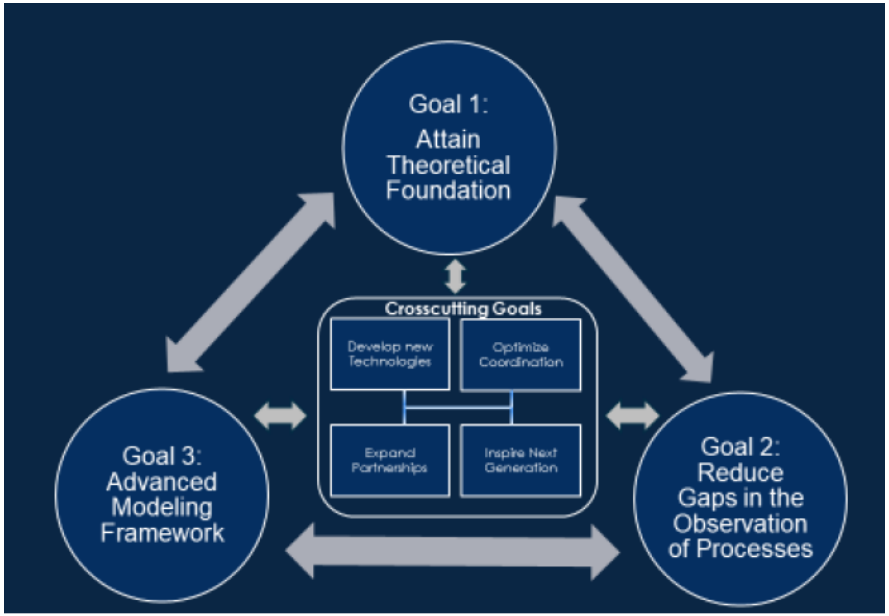

Figure 1: Key elements of the ESP R&D Strategic Framework.


Image: NOAA NWS


Image: NASA


Image: EPA

Thank you!

For more information:

Jim Hurrell(jhurrell@rams.colostate.edu)